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Evaluating Components of International Migration: The Residual Foreign Born

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Synopsis

On March 1, 2001, the U.S. Census Bureau issued the recommendation of the Executive Steering Committee for A.C.E. Policy (ESCAP) that the Census 2000 Redistricting Data not be adjusted based on the Accuracy and Coverage Evaluation (A.C.E.). By mid-October 2001, the Census Bureau had to recommend whether Census 2000 data should be adjusted for future uses, such as the census long form data products, post-censal population estimates, and demographic survey controls. In order to inform that decision, the ESCAP requested that further research be conducted.

Between March and September 2001, the Demographic Analysis-Population Estimates (DAPE) research project addressed the discrepancy between the demographic analysis data and the A.C.E. adjusted estimates of the population. Specifically, the research examined the historical levels of the components of population change to address the possibility that the 1990 Demographic Analysis understated the national population and assessed whether demographic analysis had not captured the full population growth between 1990 and 2000. Assumptions regarding the components of international migration (specifically, emigration, temporary migration, legal migration, and unauthorized migration) contain the largest uncertainty in the demographic analysis estimates. Therefore, evaluating the components of international migration was a critical activity in the DAPE project.

This report focuses on the evaluation of the U.S. Census Bureau's estimated residual foreign-born population (including both unauthorized and *quasi-legal* migrants) in 1990 and 2000. The estimates shown here were calculated in conjunction with estimates of other components of international migration: legal permanent migration and legal temporary migration. These components of international migration, along with assumed deaths and emigrants, are subtracted from a total foreign-born population yielding a residual count.

This residual foreign-born population is not an estimate of the number of unauthorized migrants. This estimate also includes people who are here legally but are not yet included in the official estimates of legal migrants and refugees. It also includes people in "quasi-legal" status who are awaiting action on their legal migration requests. Because the estimate was derived from a residual methodology, any limitations in the methods or in the measurement of other migration components are reflected in the residual number. In addition, our assumptions include a great deal of uncertainty, especially for small migration components. Therefore, the residual may be quite different from the actual number of unauthorized migrants.

According to our calculations, the estimated residual foreign-born population was 3,765,906 in 1990 and 8,705,419 in 2000. The residual foreign born were less likely to be male (48.4 percent) in 1990 than in 2000 (54.2 percent). Of the residual foreign born, 26.8 percent were from Mexico in 1990 and 44.5 percent were from Mexico in 2000.

Outline

Estimating the Residual Foreign-Born Population: 1990 and 2000

Summary

Estimates of the residual foreign-born population shown here were calculated in conjunction with estimates of other components of international migration: legal permanent migration and legal temporary migration. These "known" components of international migration, along with assumed deaths and emigrants, are subtracted from a total foreign-born population yielding a residual count. This residual foreign-born population is not an estimate of the number of unauthorized migrants. This estimate also includes people who are here legally but are not yet included in the official estimates of legal migrants and refugees. It also includes people in "quasi-legal" status who are awaiting action on their legal migration requests. Because the estimate was derived from a residual methodology, any limitations in the methods or in the measurement of other migration components are reflected in the residual number. In addition, our assumptions include a great deal of uncertainty, especially for small migration components. Therefore, the residual may be quite different from the actual number of unauthorized migrants.

According to our calculations, the estimated residual foreign-born population counted in the 1990 census was **3,765,906**. Assuming a 15-percent undercount rate (discussed later in this report) yields a population of 4,430,478 in 1990.

Selected characteristics of the residual foreign-born population counted in Census 1990 include:

- 1.8 million (48.4 percent) were male
- 1.2 million (32.8 percent) were ages 18 to 29
- 3.5 million (92.2 percent) were Nonblack
- 1.9 million (50.7 percent) were Hispanic
- 1.0 million (26.8 percent) were from Mexico

According to our calculations, the estimated residual foreign-born population counted in the 2000 census was **8,705,419**. Assuming a 15-percent undercount rate yields a population of 10,241,669 in 2000.

Selected characteristics of the residual foreign-born population counted in Census 2000 include:

- 4.7 million (54.2 percent) were male
- 3.5 million (40.0 percent) were ages 18 to 29
- 8.1 million (93.0 percent) were Nonblack
- 5.4 million (61.5 percent) were Hispanic
- 3.9 million (44.5 percent) were from Mexico

(See Tables in Appendix A for more details by age, sex, race, Hispanic origin, and place (country) of birth for both 1990 and 2000 estimates, but recall that these estimates are not of the unauthorized migrant population.)

The basic methodological approach for both 1990 and 2000 was the residual method. A decennial census sample file was used for the foreign-born population base as of April 1st. Estimates of legal permanent residents (LPRs), temporary migrants, and Special Agricultural Workers (SAWs) and pre-1982 entrants into the U.S. (LAWs) were subtracted from the foreign-born population base.[1] Assumptions were made about emigration and mortality of the legal and IRCA-legalized populations. Race and Hispanic origin distributions were assigned by age, sex, and place (country) of birth.[2] Population undercount assumptions were not included in this methodology. However, estimates of the total residual foreign-born population are shown here at different assumed levels of undercoverage.

Background

Since the 1980s, empirically-based estimates have been developed to measure the population of persons illegally present in the United States. Prior to these studies, estimates of the unauthorized population ranged from one to twelve million.[3]

The most straightforward and simplest measure of the unauthorized population has been the residual method. This method essentially removes the legal component of the census or survey-based foreign-born population, leaving behind the unauthorized component as a residual. Estimates obtained using residual methods most often are

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[1] Both the Special Agricultural Workers (SAWs) and pre-1982 entrants (LAWs) were legalized under the Immigration Reform and Control Act of 1986 (IRCA).

[2] Assignment of race and Hispanic Origin based on state-specific foreign-born populations would have been a refinement of this allocation technique, given the geographic concentration of the foreign-born population in the U.S. However, this approach was not used due to time constraints of this project.

[3] "Residual methods generally were not employed with data collected before the 1980s because the 1980 census was the first decennial census in which a sizable *enumerated* unauthorized migrant population could be detected through demographic analysis." (Fay, Passel, and Robinson, 1988 cited in Bean, 2001, p. 412)

derived from federal data providers: the U.S. Census Bureau and the Immigration and Naturalization Service (INS). Using more than one data source is required given that no one source of data includes all the necessary components for directly estimating the unauthorized population.

Adjustments to these estimates have been made since the early 1980s. Researchers have incorporated new components into their estimates of unauthorized migration. (Woodrow-Lafield, 1991; Ahmed, 1995; Passel & Clark, 1998; Bean et al., 2001) In an effort to improve the validity of the measures, we have adjusted characteristics of immigrants entering under the Special Agriculture Workers (SAWs) program, emigrants leaving the United States, and nonimmigrants (temporary admissions not for permanent residence).

Although the INS is the U.S. federal agency responsible for providing the official estimates of the unauthorized population, the U.S. Census Bureau must include assumptions about any migrants not counted in the official legal immigration data.

As part of the Bureau's evaluation of Census 2000 results and the determination as to whether the Census 2000 counts should be adjusted for purposes other than reapportionment and redistricting, the Population Division at the Census Bureau has reviewed the reliability of its demographic analysis and population estimates methodology, and the underlying components of population change, including components of international migration.

This report provides an evaluation of the residual foreign-born component of international migration as it relates to the U.S. resident population on April 1, 1990 and April 1, 2000. This residual foreign-born population is not an estimate of the number of unauthorized migrants. This estimate also includes people who are here legally but are not yet included in the official estimates of legal migrants and refugees. It also includes people in "quasi-legal" status who are awaiting action on their legal migration requests. Because the estimate was derived from a residual methodology, any limitations in the methods or in the measurement of other migration components are reflected in the residual number. In addition, our assumptions include a great deal of uncertainty, especially for small migration components. Therefore, the residual may be quite different from the actual number of unauthorized migrants.

Methods

In addition to detailing our own approach to estimating the residual foreign-born population (of which the unauthorized population is a part), this report highlights two

other methods used at the Census Bureau during the 1990s to estimate the residual foreign-born population as of 1990.[4]

In order to answer the question placed before us, "Is the assumed flow of unauthorized migration realistic?", the Demographic Analysis-Population Estimates (DAPE) team reviewed the related research conducted in the late 1980s and in the 1990s at the Census Bureau as well as other studies addressing this issue. (See Appendix B for details.)

We identified two methods as having been used in the Bureau's estimation of the residual foreign-born population as of 1990. These methods will be referred to as: 1) Woodrow's 1990 DA estimates (1991); and 2) Ahmed's 1990 preliminary census estimates (1995).

Each of the methods relies on residual techniques. In a residual technique, one or more identifiable components are subtracted from a comprehensive universe (such as the decennial census' total foreign-born population) yielding a residual estimate of a population for which no direct measure exists.

Method 1: Woodrow's 1990 DA Estimates of the Residual Foreign-Born Population, 1990[5]

Woodrow (1991) developed preliminary estimates of the 1990 residual foreign-born population as part of the 1990 Demographic Analysis Evaluation Project.[6] This project was undertaken and completed prior to the internal release of 1990 census sample data, therefore, 1990 census data were not used in these calculations.

Woodrow estimates the residual foreign-born population residing in the United States on April 1, 1990 using two approaches yielding "direct" and "implicit" estimates, as termed by Woodrow. For the first approach, a residual method was applied to the 1989 Current Population Survey (CPS) to derive the size of the residual foreign-born population. This CPS-based estimate was then extended to reflect the size of the residual foreign-born population on April 1, 1990 by assuming a linear population growth rate. Because of the uncertainties associated with the sampling and non-sampling errors as well as census under-coverage, a range of possible estimates was

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[4] Earlier Census Bureau documentation used such terms as "undocumented," "illegal," or "unauthorized" migrants. The methods and results supporting these documents were actually reflecting the residual foreign-born population.

[5] See Woodrow-Lafield, K.A. 1991. "Demographic analysis evaluation project D2: Preliminary estimates of undocumented residents in 1990." (1990 Decennial Census, Preliminary Research & Evaluation Memorandum no. 75) (22 October 1991).

[6] This analysis provided the unauthorized population number used for the 1990 DA. The 1990 DA number was used later in the construction of the 2000 DA estimates released in March 2001.

derived. Finally, from the range of possible values, a (mid)point estimate was determined for six separate census undercount scenarios. The preferred undercount scenario of 25 percent yielded a midpoint estimate of 3.3 million residual foreign-born persons.[7]

For her second approach (yielding an "implicit" estimate) Woodrow carried forward the 1980 estimate of the residual foreign-born population and estimated change in the unauthorized and IRCA-legalized populations between 1980 and 1990 based on alternative post-1980 demographic assumptions from previous CPS-based estimates. This approach requires estimates of: 1) 1980 residual foreign-born population estimate; 2) the number of IRCA legalizations (LAWs and SAWs); and 3) the net change during the period.

Based on her analysis Woodrow determined likely ranges under each method, with a 1990 estimate of 3.3 million (total residual foreign-born population in the United States) falling in the middle of each range. When considering census undercoverage (20 to 30 percent, as estimated by Woodrow) and the effect of CPS sampling and estimation errors, the estimates range from a low of 1.9 million to a high of 4.5 million.

From her 1989 November CPS data carried forward to April 1, 1990, Woodrow estimated a residual foreign-born population of 2.1 million was counted in the 1990 census (with a range of 1.6 million to 2.7 million).

Some assumptions may widen the lower end of the ranges even further. For example, the residual method based on the 1989 CPS assumed that no SAWs were counted among the foreign born because the number of SAWs then known to be living in the U.S. could not be confirmed (1991, p. 16; p. 29). Yet, Woodrow cited 1.3 million SAW applications from June 1, 1987 to November 30, 1988. The inclusion of a portion of these SAWs would reduce the level of Woodrow's proposed range.

Woodrow assumed an annual net flow of about 200,000 residual foreign born during the 1980s.[8] She based this figure on previous research using November 1979, April 1983, June 1986, June 1988, and November 1989 CPS data. With each new CPS supplement Woodrow supported the range of between 100,000 and 300,000 net annual growth in the residual foreign-born population.

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[7] Woodrow (1991) suggested that plausible levels of undercoverage in the census were between 20 and 30 percent.

[8] A net annual flow of 200,000 unauthorized migrants was used in the Bureau's postcensal population estimates during this period.

In her 1991 report, Woodrow cautioned the interpretation and use of her preliminary estimates citing the following issues:

1. Accuracy of the prior research (e.g., 2.1 million residual foreign-born persons counted in the 1980 census);
2. Additional (and unaccounted for) categories of foreign born in the U.S.;
3. Assumptions about the foreign-born undercount;
4. Lack of availability (at the time of her research) of 1990 census data; and
5. Definition and applicability of "usual place of residence" to this population.

Method 2: Ahmed's Preliminary Estimates of the Residual Foreign Born Counted in the 1990 Census

Following the preliminary Woodrow report (1991), 1990 census results were used to improve residual techniques. In the early 1990s, Bureau work on unauthorized migration (Fernandez, E.W. and J.G. Robinson, 1994; Robinson, J.G., 1994) and emigration (Ahmed, B. and J.G. Robinson, 1994) led to the first extensive internal report regarding the residual equation and how components were derived to estimate an unauthorized population counted in the 1990 census.

Assuming no coverage or estimation error in the census or in the components, Ahmed (1995) estimated that 942,000 residual foreign born were counted in the 1990 census. This figure is well below the 3.3 million total residual foreign-born population put forward in Method 1 by Woodrow (1991), as well as Woodrow's estimated 2.1 million enumerated residual foreign-born population as of 1990.

The Ahmed method uses residual techniques based on the 1990 decennial census, INS data on legal admissions and IRCA legalizations, and components of change. The 1990 census data represent the counted foreign-born population as of April 1, 1990, whereas the other components yield the expected legal population at the census date. These include the number of legal immigrants and refugees (and deaths to and emigration of these populations), foreign students, and persons illegally present who legalized under IRCA.[9] This technique assumes that the difference between the census-based total foreign-born estimate and the legal population will reflect the residual foreign-born population as counted in the 1990 census.

In his estimates, Ahmed restricts his population to those who entered between 1980 and 1990. This has an effect on both the legal and IRCA-legalized population estimates used in his method.

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[9] From the INS IRCA-legalized files, Ahmed selected cases with status granted or pending and having complete information on age, sex, and country of birth, year of entry, and intended state of and county of residence: 1,658,986 LAWs and 1,084,233 SAWs. (Ahmed 1995, pgs. 5-6)

The legal population (on the INS legal admissions files) consists of both new arrivals and adjustees. The new arrivals' year of entry is assumed to be that of the INS file; in other words, those new arrivals included in the 1980 INS file are assumed to have entered the U.S. in 1980. Adjustees were present in the U.S. prior to admission to permanent legal status, and have years of entry earlier than the year in which they appear on the INS files. Ahmed does not take this into account, but assumes that the new arrivals *and* the adjustees have years of entry corresponding the INS file year.

The IRCA-legalized population who entered the U.S. prior to 1980 was also excluded from his method.[10] He states an assumption that anyone who had come before 1980 would have been legalized under IRCA. However, the LAW population (pre-1982 entrants) would for the most part have entered the U.S. prior to 1980 (given the pre-1982 requirements as set in the IRCA legislation), and would be excluded from the 1980-1990 restricted universe in Ahmed's work. Had Ahmed included this population, his estimates of the residual foreign-born population would have been even lower, as this IRCA-legalized component is part of the legal population subtracted from the total foreign-born population counted in the census.

For a comparable universe, the legal immigrant population (in the INS Legal Permanent Resident files) should have been restricted to the legal immigrant population with years of entry 1980 to 1990. By including the additional persons (who adjusted from a nonimmigrant status, but who arrived prior to 1980) in the legal population yields a significantly decreased residual foreign-born population count.

In his calculations of legal immigration from the INS legal admissions files, Ahmed appears to have included an additional quarter of admissions (adding January through March 1980). The addition of this extra quarter overestimates the legal population.

Unlike the DAPE Method (discussed below), Ahmed does not apply emigration and death rates to the IRCA-legalized population as he does with the legal population. Fortunately, Ahmed does age the IRCA-legalized population an average of two years (from an averaged application year of 1988) to April 1990.

Ahmed restricted the temporary migrant population to the foreign student population for his work. Had this population been more broadly defined (to include other temporary residents such as H-1B workers) the overall residual foreign-born population estimate would have been lower.

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[10] When describing the LAW and SAW populations Ahmed takes into account IRCA-legalized people regardless of when they entered the U.S. However, in his calculations (shown in the formulas on pages 1 and 8 of his report) he does not appear to include the pre-1980 entrants, a large segment of the LAW population.

The Ahmed estimates were never incorporated into any official estimates produced by the Census Bureau.

Method 3 (1990): DAPE Estimates of the Residual Foreign-Born Population, 1990

The 1990 residual foreign-born estimate was calculated in conjunction with estimates of other components of international migration: legal permanent migration and legal temporary migration. These "known" components of international migration, along with assumed deaths and emigrants, are subtracted from a total foreign-born population yielding a residual count. This residual foreign-born population is not an estimate of the number of unauthorized migrants. This estimate also includes people who are here legally but are not yet included in the official estimates of legal migrants and refugees. It also includes people in "quasi-legal" status who are awaiting action on their legal migration requests. Because the estimate was derived from a residual methodology, any limitations in the methods or in the measurement of other migration components are reflected in the residual number. In addition, our assumptions include a great deal of uncertainty, especially for small migration components. Therefore, the residual may be quite different from the actual number of unauthorized migrants.

Numbers presented here are based on the entire residual foreign-born population (including some legal populations such as refugees and asylum applicants). Characteristics attributable to the residual foreign born may not be the same as for the unauthorized migrant population.

The DAPE Team estimates 3,765,906 residual foreign born were counted in the 1990 census. Adjusting for an assumed 15-percent net undercount rate, we estimate that as of April 1, 1990 the total residual foreign-born population would be 4,430,478. Adjusting for an assumed 20-percent net undercount rate, the estimated 1990 residual foreign-born population would be 4,707,383.

(Table A-1 of Appendix A shows the total residual foreign-born population as of April 1, 1990 by age, sex, race, and Hispanic origin, but recall that these estimates are not of the unauthorized migrant population.)

The foreign-born population can be depicted as:

$FB = L + U$

where *FB* is the total foreign born, and *L* and *U* are the legal and unauthorized migrant components, respectively.

The residual foreign-born population in 1990 (R_{1990}) was estimated using the following formula:

$$R_{1990} = [R_{1980} - (E_{1980-1990} + D_{1980-1990})] + FB_{1980-1990} - [(LPR_{1980-1990} + IRCA_{1980-1990}) - (E_{1980-1990} + D_{1980-1990})] - T_{1987-1990}$$

where a 1980-based estimate of the residual foreign born (R_{1980}) is carried forward to April 1, 1990 through emigration and death. *FB* is the 1990 Census total foreign born who entered the U.S. between 1980 and 1990. *LPR* is the legal permanent residents (legal admissions) component for the 1980-1990 period and *IRCA* refers to the IRCA-legalized population. These two "legal" populations are carried forward to April 1, 1990 through *E* (emigration) and *D* (death).[11]

T refers to temporary migrants (nonimmigrants) who are not affected by emigration or death because they are assumed to be continuously replaced by new temporary migrants of similar characteristics. The years of entry were limited to the past three years (1987-1990) to reflect the short-term residence of most temporary migrants.[12]

Similar to Method 2 discussed earlier, the DAPE Method uses residual techniques based on the 1990 decennial census, INS data on legal admissions, and components of change. The 1990 census data represent the *counted* foreign-born population as of April 1, 1990, whereas the latter two components yield the *expected* legal population at the census date. These include the number of legal migrants (including most refugees who adjusted to LPR status), temporary migrants, and people illegally present who legalized under IRCA,[13] deaths to and emigration of legal migrants and the IRCA-legalized population. This technique relies on the simple assumption that the difference between the census-based total foreign-born estimate and the legal population will reflect the size of the residual foreign-born population on the census date.

Adjustments were necessary to address errors in the two primary sets of data, the census data and the INS figures. Any response misreporting, such as citizenship status, through a misinterpretation of the question being asked or through an intentional misrepresentation, is not addressed by this method.

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[11] No legal migrants are assumed to have become unauthorized during the decade.

[12] For more information on the treatment of temporary migrants, see Working Paper #60.

[13] Unlike Ahmed's (1995) method (Method 2 here), this method does not include cases pending authorization in the IRCA-legalized population.

About 900,000 refugees were estimated to have entered the U.S. during the 1980s. Approximately 800,000 adjusted status during this period. The remaining 100,000 are assumed to be included in the residual amount shown here.[14]

Unauthorized Population Universe

One of the major problems in measuring unauthorized migration is defining the population. Of the unauthorized migrants physically present in the U.S. at any given time, some proportion would not be considered "usual residents" of the United States according to the definitions of enumeration used in the U.S. census. It is assumed that the DAPE Method does not include "sojourner" or "commuter" migrants—people who enter the U.S. for temporary (even daily) lengths of stay. (See Passel (1988) for more information.)

1990 Census Modified Sample File

A 1990 sample file was created for use by all DAPE teams working on international migration components. This file contains race, Hispanic origin, sex, age, place of birth, citizenship status, and other information. Race and Hispanic origin were assigned, based on the 1990 sample file distribution of the foreign born who entered the U.S. between 1980 and 1990, to components that did not have these characteristics.

This allocation method proportionally assigned race and Hispanic origin by place of birth, year of entry, age, and sex of the foreign born.[15]

People for whom no place of birth was reported (808,158 weighted cases) were assigned a place of birth based on the proportional distribution by state of the foreign-born population with reported place of birth in the 1990 sample file.

The total foreign-born population estimate from the 1990 census file, used in these calculations, is 19,767,316.[16] For the purpose of this analysis, the foreign-born population was restricted to those whose year of entry into the U.S. was between 1980 and 1990 (8,663,627).

For the year of entry question on the 1990 census, a multiple-choice format that offered ten pre-determined entry periods of various durations was used. However,

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[14] In evaluating this work in the near future, this "humanitarian" component will be treated separately helping to make possible a more precise estimate of the unauthorized population.

[15] For the DAPE work, countries of birth of the foreign born were grouped into 40 countries and regions. (See Appendix A for tables with details by place (country) of birth.)

[16] Of the total foreign-born population (all years of entry), 488,570 were in group quarters in 1990.

the Census 2000 questionnaire provided a write-in field limited to four spaces to represent the actual year of arrival.

Legal Permanent Residents (LPRs) – INS Administrative Records, 1980-1990[17]

The LPR files used for this analysis were created from the INS microdata where some allocations for age and sex have been made. The fiscal year-based INS files (October 1st to September 30th) have been converted to "census years," April 1st to March 31st.

For new arrival cases, year of admission (into legal permanent resident status) was assumed to equal year of entry into the U.S. For adjustees, year of nonimmigrant admission has been used in place of year of admission for year of entry into the U.S. as these people resided in the U.S. prior to obtaining LPR status. Of these cases, anyone with a year of entry prior to 1980 has been excluded from our analysis (542,245 cases).

Although some researchers have questioned the completeness of the records in the INS LPR files (Warren and Passel, 1987), we have not assessed the quality of the INS data for this project. Instead, we recognize that any incompleteness could lead to some legal residents being included in the residual foreign-born estimate.

IRCA-Legalized Population (LAWs (INA Section 245A) & SAWs (INA Section 210))

IRCA-legalized data for our 1990 estimates come from the 1992 Legalization Summary Public Use Tape (LSPUT) file of IRCA LAWs and SAWs, processed through August 12, 1992.[18] The file consists of 3,040,948 applications (1,763,434 LAWs and 1,277,514 SAWs). Of these, 1,031,404 LAWs (58.5 percent) and 1,256,015 SAWs (98.3 percent) entered the U.S. between 1980 and 1990. Our 1990 estimate included only those people who were granted LPR status through August 12, 1992 (942,078 LAWs and 1,057,293 SAWs). Our 2000 estimate (described below) included those cases processed throughout the remainder of the 1990s.

For the DAPE Method we assume that all the SAWs were resident in the United States as of Census Day, April 1, 1990. Of the 1.3 million SAW applications for legalization, 9,177 (0.7 percent) had a state of residence outside the 50 States and Washington, DC. (Smith, et al., 1996) Other researchers have taken different approaches to address the issue of whether SAWs were present or not at the time of the census, assuming that some portion of the SAW population (certainly greater than

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[17] Refer to Working Paper #59 for detailed information on the legal files used in this analysis.

[18] The INS discontinued the data system used to process the IRCA-related applications through August 12, 1992. By this time, the INS had processed 3.0 million applications or 88 percent of the LAW and 84 percent of the SAW cases. (Smith, et al., 1996)

0.7 percent) was not present in the U.S. at the time of the 1990 census. (Woodrow, 1991; Clark et al., 1994; Bean, 2001)

Pending cases (22,906 LAWs and 18,144 SAWs), who entered the U.S. between 1980 and 1990 are not counted in the IRCA-legalized population for our 1990 estimate, and, therefore, are included in the residual foreign-born population count for 1990. Denied cases are assumed to be counted in this residual-based foreign-born estimate as well.

Because the age of IRCA applicants was recorded as their age at the date of application, we aged this population two years to the census date, April 1, 1990. The period of application for LAWs was May 5, 1987 to May 4, 1988, and June 1, 1987 to November 30, 1988 for SAWs.

The LSPUT file contains incomplete data on race and Hispanic origin detail for the IRCA-legalized population. Therefore, we have assigned these characteristics, based on the foreign born whose entrance to the U.S. was 1980 to 1990 from the 1990 Census Modified Sample File, by age, sex, country of birth, year of entry, and citizenship status (non-citizens only).

Death to and Emigration of Legal and IRCA-Legalized Populations

Calculations of mortality and emigration rates were based on information provided by the Emigration DAPE Team. [19] This team developed the assumptions used for estimating emigration and mortality of the foreign born.

For estimating emigration, rates were assigned by age, sex, race, Hispanic origin, and country of birth. For estimating mortality, for each year of entry (beginning in 1980), survival rates were calculated by age group according to amount of time between year (time) of entry and the census year (for instance, age 0 in mid-year 1980 would have 9.75 years exposure through April 1990).[20]

Temporary Migrants (Nonimmigrants)[21]

For the 1990 estimates of international migration, data on temporary migrants come from the 1990 Census Modified Sample file. People were considered to be temporary migrants depending on their education (attainment and school enrollment), industry, occupation, employment status, income, age, year of entry, and household relationship.

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[19] See Working Paper #62 for detailed information on the emigration and mortality data and assumptions used in this analysis.

[20] Persons 100 years of age and above are assumed to have the same mortality rates (by sex).

[21] Refer to Working Paper #60 for detailed information on temporary migrants (nonimmigrants).

Not all countries are included (for example, Cuba and USSR), because people from those countries were assumed to most likely be refugees, and therefore were not counted as temporary migrants.

According to the Temporary Migrant DAPE research, 487,453 temporary migrants were counted in the 1990 census.

1980 Residual Foreign-Born Population Carried Forward to 1990

For our 1980 residual foreign-born population base, we relied on figures that Passel (1988) provided for his 1980 census-enumerated residual foreign-born population estimates. Passel estimated that about 2.1 million residual foreign born were included in the 1980 census (1.1 million men and 1.0 million women).

We allocated age, country of birth, race, and Hispanic origin to this population from the 1990 sample file distribution of the foreign born who entered the U.S. prior to 1980. This estimate was carried forward to April 1990 through emigration and death yielding a residual foreign-born population estimate of 1,770,505.

Some unauthorized migrants, included in the 1980 estimate, would eventually acquire legal status through IRCA in the 1980s. These migrants have not been removed from the 1980 estimate carried forward to 1990, and thus the result is a residual foreign-born rather than unauthorized population as of 1990.[22] (See the Limitations section of this report.)

Undercount Rates

Previous research on estimating unauthorized migration has included varying assumptions about the undercount of the foreign-born population and the rates of undercoverage by legal status. (Passel, 1988; Woodrow, 1991; Bean, 2001) Rates of undercount in the census for the unauthorized population have been assumed to be higher than for the legal population, and have generally fallen between 15 and 20 percent, with undercount rates for men being higher than for women. (Bean, 2001)

Appendix A includes four tables (A-1a, A-1b, A-2a, A-2b) showing our estimated 1990 residual foreign-born population by age, sex, race, and Hispanic origin with assumed rates of undercount at 15 and 20 percent. These rates were simply applied to the residual foreign-born population estimates shown in Table A-1, and were not integrated into the development of the estimates themselves.

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[22] This limitation will also affect the 2000 estimate. (This will be discussed in greater detail later in this report.)

Method 3 (2000): DAPE Estimates of the Residual Foreign-Born Population, 2000

The 2000-based estimates of the residual foreign born were calculated using the 1990 methodology (for the 1980 to 1990 period) *plus* the resulting 1990 estimate carried forward to April 1, 2000. As with the 1990 estimates, unauthorized migrants *and* quasi-legal migrants (e.g., refugees not adjusted to LPR status) are included in the residual-based estimate.

Our initial attempt at estimating the quasi-legal migrant population suggests that about 1.7 million (19.5 percent) were included in the residual foreign-born estimate for 2000. This estimate includes (estimated number):

- refugees (who have not yet adjusted status) and asylum applicants (awaiting claim adjudication) (200,000 and 400,000, respectively)
- migrants deported during the decade (200,000)
- population legalizing (adjusting status) during the decade (900,000)

Numbers presented here are based on the entire residual foreign-born population (including some legal populations such as refugees and asylum applicants). Characteristics attributable to the residual foreign born may not be the same as for the unauthorized migrant population.

The DAPE Team estimates 8,705,419 residual foreign born were counted in the 2000 census. Adjusting for undercount, we estimate that as of April 1, 2000 the total residual foreign-born population was 10,241,669 (15 percent undercount). This estimate was used for the revised DA estimate for 2000.

(Table A-3 of Appendix A shows the total residual foreign-born population as of April 1, 2000 by age, sex, and race and Hispanic origin, but recall that these estimates are not of the unauthorized migrant population.)

1990 Methodology Applied to 2000

Our 2000 method uses residual techniques based on preliminary 2000 census data, INS data on legal admissions 1990 to 2000,[23] and components of change. The 2000 census data represent the *counted* foreign-born population as of April 1, 2000, whereas the latter two components yield the *expected* legal population at the census date. These include the number of legal migrants (including most refugees who adjusted to LPR status), temporary migrants, and persons illegally present who

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[23] INS data on legal immigrants and refugees are available through fiscal year 1999 (September 1999). A population as of April 1, 2000 is needed for our analysis. An October 1999-March 2000 population was estimated using the distributions of the FY 1999 file.

legalized under IRCA who were processed *after* August 12, 1992,[24] deaths to and emigration of legal migrants and the IRCA-legalized population. This technique relies on the simple assumption that the difference between the census-based total foreign-born estimate and the legal population will reflect the size of the residual foreign-born population on the census date.

2000 Census Preliminary Sample File

The total foreign-born population estimate from the Census 2000 Preliminary Sample File, used in these calculations, was 31,098,946.[25] For the 2000 estimates, the foreign-born population was restricted to those whose year of entry into the U.S. was between April 1990 and March 2000 (12,518,098).

The Census 2000 file used for these estimates (and those of other international migration components in the DAPE project) may differ from final census files processed later in 2001/2002.[26]

1990 Residual Foreign-Born Population Carried Forward to 2000

The 1990 estimate of 3,765,906 should be reduced due to death (162,830), emigration (391,275), and adjustment of status of unauthorized migrants included in the 1990 residual foreign-born population who adjusted throughout the 1990s (about 900,000). However, the population legalizing during the decade was not removed from this 1990 residual foreign-born population carried forward to 2000.[27]

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[24] The 2000 method picks up where the 1990 method left off with regard to the IRCA-legalized population. As of August 12, 1992, 22,906 LAWs and 18,144 SAWs were pending authorization. With the use of published INS data (INS, 2000), cases identified as pending in the IRCA files were "matched" to actual cases approved post-August 1992. As limited detail was included in the published data, characteristics were assigned to these cases based on IRCA LSPUT information used in the 1990-based estimates. It is assumed that the only reason why these cases were pending was administrative in nature, and, therefore, had no bearing on the applicants' characteristics.

[25] Of the total foreign-born population (all years of entry), 543,435 were estimated to be in group quarters in 2000.

[26] Final edit specifications and weighting schemes had not yet been fully developed for use in these preliminary sample files.

[27] Beginning in October 1994, section 245(i) of the Immigration & Nationality Act (INA) allowed unauthorized residents who were eligible for legal immigrant status to remain in the U.S. and adjust to permanent resident status by applying at an INS office and paying a fee. Prior to October 1994, most unauthorized residents were required to leave the U.S. and acquire a visa abroad from the Department of State as they are again now. (INS, pA.3-2, 2000)

Limitations

Although the residual technique used to derive estimates of the residual foreign born is based on the simple idea of subtracting the expected legal population from the counted foreign-born population at the census date, the approach suffers from a number of limitations. These limitations stem from anomalies and shortcomings in the data sets used, assumptions made to correct for data deficiencies or to derive intermediate estimates, and the exclusion of components that may prove to be relevant in the changing migration environment.

Inclusion of Quasi-Legal Migrants in the Residual Foreign-Born Estimate

The most important limitation to the methodology and the resulting estimates described in this report pertains to the inclusion of quasi-legal migrants (e.g., refugees not adjusted for LPR status) in the residual foreign-born estimate. This limitation appears to have a greater impact on the 2000 estimate than on the 1990 estimate. This is actually not a limitation for the use of this estimate in calculating coverage since legal status is not relevant.

Data Quality and Other Data Source Limitations

The precision of our results will depend upon the quality and completeness of the data used, namely the decennial census files, and the administrative records of legal and IRCA-legalized populations provided by the INS.

Other data source limitations include:
- For the 2000 estimate, final Census 2000 sample data were not available at the time of this project;
- Individual years-of-entry from 1990 census were unattainable given questionnaire response options;
- Accuracy of 1980 residual foreign-born estimate was unknown; and
- Emigration and mortality rates were assumed to be the same regardless of legal status.

Methodological Limitations

- Limitations of other international migration components are carried over into our estimates;
- Flow (INS) data were modified to be combined with stock (Census) data;
- For calculations, assumed 100 percent census coverage of foreign born regardless of legal status;
- For the 1990 estimate, assume 100 percent of SAWs were present in U.S. on April 1, 1990;

- Some "humanitarian" populations (i.e., non-adjusted refugees and asylum applicants) were omitted from legal population, and, therefore, included in residual foreign-born count;
- IRCA-legalized 1990 estimate was restricted to people granted permanent legal status (Phase II decisions); pending cases were included in the residual foreign born in 1990 estimate;
- Applicability of "usual residence" unclear for migrants;
- Assumed no difference in race or Hispanic origin identification between administrative records and census; and
- Approximated characteristics of the 1980 residual foreign-born population based on the foreign born who reported pre-1980 entries in the 1990 Census.

Time Constraints

The DAPE project began in late April 2001, and was originally scheduled for completion by July 31, 2001. Extensions were granted through September 10th for the DAPE task of estimating the residual foreign-born population as of 1990 and 2000.

However, lack of detailed, historical documentation on both source files and assumptions and methods led to delays in meeting the milestones of the overall project timeline. In addition, several technical obstacles resulted due to limited documentation.

Comparisons of our 1990 estimates with the official (original) 1990 DA work by Woodrow (1991) could not be made given different data sources and limited time to replicate her CPS-based work while preparing our census and administrative records-based estimates.

Therefore, future work should include a validation of the 1990 DA work by Woodrow, along with additional research into alternative methods and data by other researchers working on this issue. (Espenshade, 1995a; Passel, 1998; Warren, 2000; Bean, 2001)

Impact of Legislation on Migratory Patterns and Quality of Data Collection

Legislation such as IRCA and more recent legislation in the 1990s including the changes to the Immigration & Nationality Act (INA) in 1990 and migration-related legislative changes in 1996 (e.g., Illegal Immigration Reform and Immigrant Responsibility Act (IIRIRA) (Pub. L. 104-208); Antiterrorism and Effective Death Penalty Act (AEDPA) (Pub. L. 104-132) impact both migratory patterns and the quality of data collection. Movement across borders (and into legal statuses) are facilitated and impeded by legislation. Data collection instruments and the type of

data collected also change with new legislation. These changes, such as with the IRCA legalizations (and related data), affect our estimates as well.

Undercount Rates

Undercount rates are used in this report only for illustrative purposes. Nowhere within this report has there been a comprehensive evaluation of undercount rates for the foreign-born population by legal status or otherwise. Our 1990 and 2000 estimates are shown in Appendix A tables for both census (enumerated) and DA ("true" or resident) levels. In line with contemporary research on undercoverage of the foreign born, undercount rates of 15 and 20 percent (DA level estimates) are presented along with the census-level estimates of the residual foreign-born population as of 1990 and 2000.

From all appearances, the 2000 census is more complete and accurate than 1990. The advertising campaign, partnership programs, and use of the Master Address File (MAF) may have contributed to the improved coverage of the 2000 census.

Assessing the coverage of the foreign-born and both the legal and residual foreign-born populations is important to developing improved estimates of each population. As part of the Post Enumeration Survey (PES) for the 1990 census, undercount rates were not calculated for the foreign born in particular. Race and Hispanic origin-specific rates were derived that can be used to approximate such rates for the foreign born. Harder still is the development of undercount rates by legal status. Again, researchers outside the Census Bureau have analyzed this issue and have provided their own rates by legal status. (Binational Study, 1997; Bean, 2001).

Anecdotal evidence suggests that census coverage improved between the 1990 and 2000 decennial censuses. Hence, undercount rates for the residual foreign-born population are assumed to have improved between 1990 and 2000.[28]

IRCA-Legalized Population

Our 1990 residual foreign-born estimate includes the IRCA-legalized population through August 12, 1992. People granted legal status *after* April 1, 1990 (but before August 13, 1992) would be included in our 1990 residual-based estimate as legal, thereby reducing the "true" unauthorized population present on Census Day, April 1, 1990.

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[28] The revised DA estimates used a 15-percent net undercount rate assumption for the residual foreign born in 2000, and a 20-percent net undercount rate assumption for the residual foreign born in 1990.

Results

We put forward estimates of the residual foreign-born population residing in the United States as of April 1, 1990 and April 1, 2000, as shown below in Table 1.

Table 1. Estimates of the Residual Foreign Born, by DA Race and Sex: 1990 and 2000

Subject	1990			2000		
	Total	Male	Female	Total	Male	Female
Counted in Census	3765906	1822406	1943500	8705419	4717733	3987686
Black	293708	150284	143424	611499	317121	294378
Nonblack	3472198	1672122	1800076	8093920	4400612	3693308
Assumed 15-percent Undercount	4430477	2144007	2286470	10241670	5550275	4691395
Black	345539	176805	168734	719411	373084	346327
Nonblack	4084938	1967202	2117736	9522259	5177191	4345068
Assumed 20-percent Undercount	4707383	2278008	2429375	10881774	5897166	4984608
Black	367135	187855	179280	764374	396401	367973
Nonblack	4340248	2090153	2250095	10117400	5500765	4616635

NOTE: This residual foreign-born population is not an estimate of the number of unauthorized migrants. This estimate also includes people in "quasi-legal" status who are awaiting action on their legal migration requests. Any limitations in the methods or in the measurement of other migration components are reflected in the residual number.

1990 Estimates

According to our calculations shown above in Table 1, the estimated residual foreign-born population counted in the 1990 census was **3,765,906**. Assuming a 15-percent undercount rate yields a residual foreign-born population of 4,430,478 in 1990.

Of the 3.8 million, 1.8 million (48.4 percent) were male (Table A-1); 1.2 million (32.8 percent) were ages 18 to 29 (Table A-1); 3.5 million (92.2 percent) were Nonblack (Table A-1); 1.9 million (50.7 percent) were Hispanic (Table A-2); and 1.0 million (26.8 percent) were from Mexico (Table A-7).

2000 Estimates

According to our calculations shown above in Table 1, the estimated residual foreign-born population counted in the 2000 census was **8,705,419**. Assuming a 15-percent undercount rate yields a residual foreign-born population of 10,241,669 in 2000.

Of the 8.7 million, 4.7 million (54.2 percent) were male (Table A-3); 3.5 million (40.0 percent) were ages 18 to 29 (Table A-3); 8.1 million (93.0 percent) were Nonblack (Table A-3); 5.4 million (61.5 percent) were Hispanic (Table A-4); and 3.9 million (44.5 percent) were from Mexico (Table A-8).

(See Appendix A for extensive detail by age, sex, race, Hispanic origin, and place (country) of birth for both 1990 and 2000 estimates, but recall that these estimates are not of the unauthorized migrant population.)

Our new 1990 estimate, also with an assumed undercount rate of 25 percent, is 5.0 million, well above the Woodrow 1990 DA figure of 3.3 million.[29] To clarify, Woodrow's DA estimate was computed based on November 1989 CPS data, prior to the availability of the 1990 census sample files.

Our estimates are based on a modified 1990 census sample file, and include legal migrants not explicitly accounted for in other legal migrant components of this project.

Comparing the DAPE 1990 and 2000 Estimates with Other Findings (Woodrow, 1991; Ahmed, 1995; Warren, unpublished; Bean, 2001; Passel, 2001)

Although not included here, a comprehensive analysis of our estimates would comprise an evaluation beyond total population counts to include reviews by specific countries of birth, age, sex, race/Hispanic origin, year of entry, and other components of migration (used to derive these estimates). [30]

Even though the sources used similar techniques, estimates of the size of the residual foreign-born population varied widely. Ahmed (Method 2) placed the figure at 942,000 while Woodrow (Method 1) found the number to be 2.1 million *counted* in the 1990 census.[31]

Discrepancies among estimates, in comparing our 1990 estimates with both Ahmed (1995) and Woodrow (1991), can be summarized as follows:

1. Adjustments for Undercount: Not all methods included an adjustment for undercount of the foreign born or by legal status. Neither the DAPE Method nor Ahmed's make assumptions about undercount in the calculations of the residual foreign-born population. Woodrow (1991) assumes undercoverage in the census and makes allowances for sampling and estimation error in the CPS.

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[29] Woodrow's (1991) DA-level estimate of 3.3 million was calculated based on an assumed 25 percent undercount of unauthorized migrants in the 1990 census.
[30] Such a review is forthcoming.
[31] As mentioned previously, Woodrow did not make use of 1990 census data for her estimates. She estimated the residual foreign-born population as of November 1989 and carried them forward (through emigration and death) to April 1, 1990.

2. <u>Death and Emigration</u>: Estimates of deaths to and emigration of legal immigrants were calculate for both Method 1 and Method 2, but figures were not always incorporated in the calculations of the residual foreign-born population.

3. <u>IRCA LAWs and SAWs</u>: The figures for LAWs and SAWs differed greatly from one source to another. These differences may account for significant discrepancies in the estimates of the residual foreign-born population across methods.

4. <u>Country-Specific (Negative) Estimates</u>: While the range of derived figures for the residual foreign-born population may be plausible, evaluating the total number reveals some inconsistencies. For a number of countries the estimates are negative, and this is true across methods. On the other hand, the derived estimates for other countries seem over-estimated. For example, the Ahmed report places the size of residual foreign-born population from Mexico at about 160,000 or 17 percent, which appears to be low. We estimated that 27 percent of the residual foreign born in 1990 was from Mexico; our 2000 estimate was closer to 45 percent from Mexico. Most studies indicate that Mexico constitutes a substantial proportion of the unauthorized population, around 55 percent. (Warren, 2000; Bean, 2001)

In comparison with our 2000 residual estimate, Warren (unpublished) suggests 6.7 million unauthorized migrants were counted in the 2000 census, and that when undercount of the foreign born was taken into consideration (by legal status) the unauthorized resident population count rose to 7.6 million.

Bean (2001) estimates about 2.5 million Mexicans were residing in the U.S. in March 1996 yielding an estimated 3.9 million unauthorized migrants from Mexico (when carried forward to March 2000). Through our calculations of the counted residual foreign born in 2000, we estimated 3.9 million Mexicans (44.5 percent of the residual foreign born in 2000).[32] Bean also estimates a total unauthorized population of about 7.1 million in 2000.

According to the 1990 residual results, the 18-49 age group accounted for 58 percent of the total population; for the 2000 estimate the proportion of the same age group is 70 percent.

Analysis of the sex structure, on the other hand, shows the number of residual foreign-born women greater than the number of residual foreign-born men in 1990; for the 2000 results, more residual foreign-born men were living in the country. The greater number of women in 1990 was unexpected as migrants were disproportionately male, but it may be attributed to the effect of the IRCA legalization program. Because more men benefited from the amnesty than women and were

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[32] Bean assumes that 55 percent of the unauthorized population would be Mexican in 2000.

subsequently allowed to bring their families to the U.S., it is conceivable that the number of residual foreign-born women was higher than the number of residual foreign-born men in 1990. This explanation is consistent with the higher number of Hispanic women aged 18 to 49.

Next Steps – Improvements in Current Approach and Alternative Methods of Measurement

Research will be conducted in the near future on the extent to which the 1990 and 2000 estimates can be revised to more accurately reflect the unauthorized migrant component of the residual foreign-born population. Some minor changes are readily apparent and relatively simple to incorporate into the current methodology.

Our selection of a single method by which to estimate the unauthorized population for the DAPE task should not be misinterpreted as a clear preference for one methodology.

The DAPE project was endeavored to be an "integrated" process. In other words, all of the task teams that were responsible for estimating a single component of international migration (e.g., legal, unauthorized, and temporary migrants, and emigrants) were required to integrate their work (methods, assumptions, and data sources) wherever possible.

Estimates of unauthorized migration (flow) and unauthorized migrants (stock) that use alternative data sources (e.g., apprehensions data (Espenshade, (1995a); 3-Card Method (GAO, 1998)) should be explored to test the validity and reliability of the estimates produced here.

Alternative assumptions and methods developed outside the Bureau should be examined more closely as well. Warren (2000 and unpublished), Bean (2001), and Passel (1998 and 2001) have provided extensive detail on the estimation of the unauthorized population.

Their research provides invaluable information that should be referenced regularly as the Census Bureau revisits its estimates of the residual foreign-born and unauthorized migrant populations.

Appendix A. Tables*

This residual foreign-born population is not an estimate of the number of unauthorized migrants. This estimate also includes people who are here legally but are not yet included in the official estimates of legal migrants and refugees. It also includes people in "quasi-legal" status who are awaiting action on their legal migration requests. Because the estimate was derived from a residual methodology, any limitations in the methods or in the measurement of other migration components are reflected in the residual number. In addition, our assumptions include a great deal of uncertainty, especially for small migration components. Therefore, the residual may be quite different from the actual number of unauthorized migrants.

* Numbers shown here may differ from numbers produced in actual calculations due to rounding.

Table A-1. Estimates of the Residual Foreign Born by DA Race, Sex, and Age: 1990 (Census Level)*

Age	All Races			Black			Nonblack		
	Total	Male	Female	*Total*	Male	Female	*Total*	Male	Female
All ages	3765906	1822406	1943500	293708	150284	143424	3472198	1672122	1800076
0-17	1081957	567688	514269	85713	43374	42339	996244	524314	471930
18-29	1236149	625957	610192	109435	59313	50122	1126714	566644	560070
30-49	953514	423177	530337	75283	37944	37339	878231	385233	492998
50+	494286	205584	288702	23277	9653	13624	471009	195931	275078
50-64	312027	137116	174911	14314	6539	7775	297713	130577	167136
65+	182259	68468	113791	8963	3114	5849	173296	65354	107942

* Numbers shown here may differ from numbers produced in actual calculations due to rounding.

NOTE: This residual foreign-born population is not an estimate of the number of unauthorized migrants. This estimate also includes people in "quasi-legal" status who are awaiting action on their legal migration requests. Any limitations in the methods or in the measurement of other migration components are reflected in the residual number.

Table A-1a. Estimates of the Residual Foreign Born, adjusted for 15 percent undercount[a], by DA Race, Sex, and Age: 1990*

Age	All Races			Black			Nonblack		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
All ages	4430478	2144007	2286471	345539	176805	168734	4084939	1967202	2117736
0-17	1272891	667868	605022	100839	51028	49811	1172052	616840	555212
18-29	1454293	736420	717873	128747	69780	58967	1325546	666640	658906
30-49	1121781	497855	623926	88568	44640	43928	1033213	453215	579998
50+	581513	241864	339649	27385	11356	16028	554128	230507	323621
50-64	367091	161313	205778	16840	7693	9147	350251	153620	196631
65+	214422	80551	133872	10545	3664	6881	203878	76887	126991

[a] Census level divided by 0.85

Table A-1b. Estimates of the Residual Foreign Born, adjusted for 20 percent undercount[a], by DA Race, Sex, and Age: 1990*

Age	All Races			Black			Nonblack		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
All ages	4707383	2278008	2429375	367135	187855	179280	4340248	2090153	2250095
0-17	1352446	709610	642836	107141	54218	52924	1245305	655393	589913
18-29	1545186	782446	762740	136794	74141	62653	1408393	708305	700088
30-49	1191893	528971	662921	94104	47430	46674	1097789	481541	616248
50+	617858	256980	360878	29096	12066	17030	588761	244914	343848
50-64	390034	171395	218639	17893	8174	9719	372141	163221	208920
65+	227824	85585	142239	11204	3893	7311	216620	81693	134928

[a] Census level divided by 0.80

* Numbers shown here may differ from numbers produced in actual calculations due to rounding.

NOTE: This residual foreign-born population is not an estimate of the number of unauthorized migrants. This estimate also includes people in "quasi-legal" status who are awaiting action on their legal migration requests. Any limitations in the methods or in the measurement of other migration components are reflected in the residual number.

Table A-2. Estimates of the Residual Foreign Born by DA Race and Hispanic Origin, Sex, and Age: 1990 (Census Level)*

Age	All Races			Non-Hispanic White			Non-Hispanic Black			Non-Hispanic API			Non-Hispanic AIAN			Hispanic		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
All ages	3765902	1822406	1943496	918409	458058	460351	205391	105923	99468	727482	380561	346921	5392	2774	2618	1909228	875090	1034138
0-17	1081957	567689	514268	151556	78321	73235	58607	29513	29094	217227	112987	104240	1319	699	620	653248	346169	307079
18-29	1236149	625957	610192	240827	136120	104707	79048	42522	36526	245942	135046	110896	1918	1102	816	668414	311167	357247
30-49	953513	423177	530336	297584	149466	148118	54049	28146	25903	225094	110700	114394	1510	757	753	375276	134108	241168
50+	494283	205583	288700	228442	94151	134291	13687	5742	7945	39219	21828	17391	645	216	429	212290	83646	128644
50-64	312025	137115	174910	142287	62446	79841	8415	3933	4482	30082	17559	12523	392	126	266	130849	53051	77798
65+	182258	68468	113790	86155	31705	54450	5272	1809	3463	9137	4269	4868	253	90	163	81441	30595	50846

* Numbers shown here may differ from numbers produced in actual calculations due to rounding.

NOTE: This residual foreign-born population is not an estimate of the number of unauthorized migrants. This estimate also includes people in "quasi-legal" status who are awaiting action on their legal migration requests. Any limitations in the methods or in the measurement of other migration components are reflected in the residual number.

Table A-2a. Estimates of the Residual Foreign Born, adjusted for 15 percent undercount[a], by DA Race and Hispanic Origin, Sex, and Age: 1990*

Age	All Races			Non-Hispanic White			Non-Hispanic Black			Non-Hispanic API			Non-Hispanic AIAN			Hispanic		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
All ages	4430473	2144007	2286466	1080481	538892	541589	241636	124615	117021	855861	447719	408142	6344	3264	3080	2246151	1029518	1216633
0-17	1272891	667869	605021	178301	92142	86159	68949	34721	34228	255561	132926	122635	1552	822	729	768527	407258	361269
18-29	1454293	736420	717873	283326	160141	123185	92998	50026	42972	289344	158878	130466	2256	1296	960	786369	366079	420291
30-49	1121780	497855	623925	350099	175842	174256	63587	33113	30474	264816	130235	134581	1776	891	886	441501	157774	283727
50+	581509	241862	339647	268755	110766	157989	16102	6755	9347	46140	25680	20460	759	254	505	249753	98407	151346
50-64	367088	161312	205776	167396	73466	93931	9900	4627	5273	35391	20658	14733	461	148	313	153940	62413	91527
65+	214421	80551	133871	101359	37300	64059	6202	2128	4074	10749	5022	5727	298	106	192	95813	35994	59819

[a] Census level divided by 0.85

Table A-2b. Estimates of the Residual Foreign Born, adjusted for 20 percent undercount[a], by DA Race and Hispanic Origin, Sex, and Age: 1990*

Age	All Races			Non-Hispanic White			Non-Hispanic Black			Non-Hispanic API			Non-Hispanic AIAN			Hispanic		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
All ages	4707378	2278008	2429370	1148011	572573	575439	256739	132404	124335	909353	475701	433651	6740	3468	3273	2386535	1093863	1292673
0-17	1352446	709611	642835	189445	97901	91544	73259	36891	36368	271534	141234	130300	1649	874	775	816560	432711	383849
18-29	1545186	782446	762740	301034	170150	130884	98810	53153	45658	307428	168808	138620	2398	1378	1020	835518	388959	446559
30-49	1191891	528971	662920	371980	186833	185148	67561	35183	32379	281368	138375	142993	1888	946	941	469095	167635	301460
50+	617854	256979	360875	285553	117689	167864	17109	7178	9931	49024	27285	21739	806	270	536	265363	104558	160805
50-64	390031	171394	218638	177859	78058	99801	10519	4916	5603	37603	21949	15654	490	158	333	163561	66314	97248
65+	227823	85585	142238	107694	39631	68063	6590	2261	4329	11421	5336	6085	316	113	204	101801	38244	63558

[a] Census level divided by 0.80

* Numbers shown here may differ from numbers produced in actual calculations due to rounding.

NOTE: This residual foreign-born population is not an estimate of the number of unauthorized migrants. This estimate also includes people in "quasi-legal" status who are awaiting action on their legal migration requests. Any limitations in the methods or in the measurement of other migration components are reflected in the residual number.

Table A-3. Estimates of the Residual Foreign Born by DA Race, Sex, and Age: 2000 (Census Level)*

Age	All Races			Black			Nonblack		
	Total	Male	Female	*Total*	Male	Female	*Total*	Male	Female
All ages	8705419	4717733	3987686	611499	317121	294378	8093920	4400612	3693308
0-17	1988956	1029065	959891	164480	82111	82369	1824476	946954	877522
18-29	3483802	2026526	1457276	197987	101905	96082	3285815	1924621	1361194
30-49	2605123	1374099	1231024	224089	121384	102705	2381034	1252715	1128319
50+	627538	288043	339495	24943	11721	13222	602595	276322	326273
50-64	407613	194747	212866	15126	7452	7674	392487	187295	205192
65+	219925	93296	126629	9817	4269	5548	210108	89027	121081

* Numbers shown here may differ from numbers produced in actual calculations due to rounding.

NOTE: This residual foreign-born population is not an estimate of the number of unauthorized migrants. This estimate also includes people in "quasi-legal" status who are awaiting action on their legal migration requests. Any limitations in the methods or in the measurement of other migration components are reflected in the residual number.

Table A-3a. Estimates of the Residual Foreign Born, adjusted for 15 percent undercount[a], by DA Race, Sex and Age: 2000*

Age	All Races			Black			Nonblack		
	Total	Male	Female	*Total*	Male	Female	*Total*	Male	Female
All ages	10241669	5550274	4691395	719411	373084	346327	9522259	5177191	4345068
0-17	2339948	1210665	1129284	193506	96601	96905	2146442	1114064	1032379
18-29	4098591	2384148	1714442	232926	119888	113038	3865665	2264260	1601405
30-49	3064851	1616587	1448264	263634	142805	120829	2801216	1473782	1327434
50+	738280	338874	399406	29345	13789	15555	708935	325085	383851
50-64	479545	229114	250431	17795	8767	9028	461749	220347	241402
65+	258735	109760	148975	11549	5022	6527	247186	104738	142448

[a] **Census level divided by 0.85**

Table A-3b. Estimates of the Residual Foreign Born, adjusted for 20 percent undercount[a], by DA Race, Sex and Age: 2000*

Age	All Races			Black			Nonblack		
	Total	Male	Female	*Total*	Male	Female	*Total*	Male	Female
All ages	10881774	5897166	4984608	764374	396401	367973	10117400	5500765	4616635
0-17	2486195	1286331	1199864	205600	102639	102961	2280595	1183693	1096903
18-29	4354753	2533158	1821595	247484	127381	120103	4107269	2405776	1701493
30-49	3256404	1717624	1538780	280111	151730	128381	2976293	1565894	1410399
50+	784423	360054	424369	31179	14651	16528	753244	345403	407841
50-64	509516	243434	266083	18908	9315	9593	490609	234119	256490
65+	274906	116620	158286	12271	5336	6935	262635	111284	151351

[a] **Census level divided by 0.80**

* Numbers shown here may differ from numbers produced in actual calculations due to rounding.

NOTE: This residual foreign-born population is not an estimate of the number of unauthorized migrants. This estimate also includes people in "quasi-legal" status who are awaiting action on their legal migration requests. Any limitations in the methods or in the measurement of other migration components are reflected in the residual number.

Table A-4. Estimates of the Residual Foreign Born by DA Race and Hispanic Origin, Sex, and Age: 2000 (Census Level)* **

Age	All Races			Non-Hispanic White			Non-Hispanic Black			Non-Hispanic API			Non-Hispanic AIAN			Hispanic		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
All ages	8705418	4717731	3987687	1604584	820254	784330	470640	240013	230627	1258659	686118	572541	17941	9365	8576	5353594	2961981	2391613
0-17	1988956	1029065	959891	373698	190680	183018	133081	65928	67153	292738	138919	153819	6767	3380	3387	1182672	630158	552514
18-29	3483801	2026525	1457276	425162	222307	202855	146075	70744	75331	505539	269205	236334	4955	2516	2439	2402070	1461753	940317
30-49	2605122	1374098	1231024	507594	281644	225950	177383	96223	81160	455405	259868	195537	5296	2941	2355	1459444	733422	726022
50+	627539	288043	339496	298130	125623	172507	14101	7118	6983	4977	18126	-13149	923	528	395	309408	136648	172760
50-64	407613	194747	212866	167588	74470	93118	8115	4259	3856	23647	18847	4800	675	463	212	207588	96708	110880
65+	219926	93296	126630	130542	51153	79389	5986	2859	3127	-18670	-721	-17949	248	65	183	101820	39940	61880

* Numbers shown here may differ from numbers produced in actual calculations due to rounding.
** Numbers shown with "-" reflect negative values. See Results section entitled "Country-Specific (Negative) Estimates" for more information.

NOTE: This residual foreign-born population is not an estimate of the number of unauthorized migrants. This estimate also includes people in "quasi-legal" status who are awaiting action on their legal migration requests. Any limitations in the methods or in the measurement of other migration components are reflected in the residual number.

Table A-4a. Estimates of the Residual Foreign Born, adjusted for 15 percent undercount[a], by DA Race and Hispanic Origin, Sex, and Age: 2000* **

Age	All Races			Non-Hispanic White			Non-Hispanic Black			Non-Hispanic API			Non-Hispanic AIAN			Hispanic		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
All ages	10241668	5550272	4691396	1887746	965005	922741	553694	282368	271326	1480775	807198	673578	21107	11018	10089	6298346	3484684	2813662
0-17	2339948	1210665	1129284	439645	224329	215315	156566	77562	79004	344398	163434	180964	7961	3976	3985	1391379	741362	650016
18-29	4098589	2384147	1714442	500191	261538	238653	171853	83228	88625	594752	316712	278040	5829	2960	2869	2825965	1719709	1106255
30-49	3064849	1616586	1448264	597169	331346	265824	208686	113204	95482	535771	305727	230044	6231	3460	2771	1716993	862849	854144
50+	738281	338874	399407	350741	147792	202949	16589	8374	8215	5855	21325	-15469	1086	621	465	364009	160762	203247
50-64	479545	229114	250431	197162	87612	109551	9547	5011	4536	27820	22173	5647	794	545	249	244221	113774	130447
65+	258736	109760	148976	153579	60180	93399	7042	3364	3679	-21965	-848	-21116	292	76	215	119788	46988	72800

[a] Census level divided by 0.85

Table A-4b. Estimates of the Residual Foreign Born, adjusted for 20 percent undercount[a], by DA Race and Hispanic Origin, Sex, and Age: 2000* **

Age	All Races			Non-Hispanic White			Non-Hispanic Black			Non-Hispanic API			Non-Hispanic AIAN			Hispanic		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
All ages	10881773	5897164	4984609	2005730	1025318	980413	588300	300016	288284	1573324	857648	715676	22426	11706	10720	6691993	3702476	2989516
0-17	2486195	1286331	1199864	467123	238350	228773	166351	82410	83941	365923	173649	192274	8459	4225	4234	1478340	787698	690643
18-29	4354751	2533156	1821595	531453	277884	253569	182594	88430	94164	631924	336506	295418	6194	3145	3049	3002588	1827191	1175396
30-49	3256403	1717623	1538780	634493	352055	282438	221729	120279	101450	569256	324835	244421	6620	3676	2944	1824305	916778	907528
50+	784424	360054	424370	372663	157029	215634	17626	8898	8729	6221	22658	-16436	1154	660	494	386760	170810	215950
50-64	509516	243434	266083	209485	93088	116398	10144	5324	4820	29559	23559	6000	844	579	265	259485	120885	138600
65+	274908	116620	158288	163178	63941	99236	7483	3574	3909	-23338	-901	-22436	310	81	229	127275	49925	77350

[a] Census level divided by 0.80

* Numbers shown here may differ from numbers produced in actual calculations due to rounding.
** Numbers shown with "-" reflect negative values. See Results section entitled "Country-Specific (Negative) Estimates" for more information.

NOTE: This residual foreign-born population is not an estimate of the number of unauthorized migrants. This estimate also includes people in "quasi-legal" status who are awaiting action on their legal migration requests. Any limitations in the methods or in the measurement of other migration components are reflected in the residual number.

Table A-5. Estimates of the Residual Foreign Born by Place of Birth and Sex, 1990*

Country of Birth	Total	Male	Female
Total	**3,765,897**	**1,822,403**	**1,943,494**
North and Central America	**1,891,000**	**849,425**	**1,041,575**
Mexico	1,008,372	396,602	611,770
Cuba	157,187	83,716	73,471
Dominican Republic	28,243	13,736	14,507
El Salvador	203,308	112,978	90,330
Guatemala	97,817	52,883	44,934
Canada	114,394	51,863	62,531
Haiti	11,797	1,860	9,937
Jamaica	17,838	9,253	8,585
Trinidad & Tobago	31,069	14,753	16,316
Other North & Central America	220,975	111,781	109,194
South America	**278,093**	**144,669**	**133,424**
Argentina	22,507	12,055	10,452
Colombia	78,592	39,701	38,891
Ecuador	41,210	22,210	19,000
Peru	43,976	22,295	21,681
Other South America	91,808	48,408	43,400
Europe	**649,285**	**316,737**	**332,548**
France	21,110	9,465	11,645
Germany	78,199	32,629	45,570
Greece	14,385	8,603	5,782
Ireland	20,024	9,944	10,080
Italy	56,368	30,177	26,191
Netherlands	13,516	7,010	6,506
Poland	65,838	33,547	32,291
Portugal	37,638	20,661	16,977
Spain	17,990	9,691	8,299
U.S.S.R. (incl. Est., Lat., Lith.)	111,674	54,320	57,354
United Kingdom	109,806	50,384	59,422
Yugoslavia	18,361	10,130	8,231
Other Europe	84,376	40,176	44,200
Asia	**834,643**	**445,990**	**388,653**
Middle East	122,886	73,932	48,954
Iran	47,507	27,298	20,209
Israel	24,479	14,227	10,252
Other Middle East (incl. Afghanistan)	50,900	32,407	18,493
South & East Asia	711,757	372,058	339,699
China (incl. Taiwan)	137,068	74,803	62,265
India	51,137	32,474	18,663
Japan	86,564	39,795	46,769
Korea	77,226	41,738	35,488
Philippines	114,350	57,837	56,513
Other South & East Asia	245,412	125,411	120,001
Africa	**89,619**	**52,889**	**36,730**
Oceania	**23,257**	**12,693**	**10,564**
Australia	8,515	4,714	3,801
Other Oceania	14,742	7,979	6,763

* Numbers shown here may differ from numbers produced in actual calculations due to rounding.
NOTE: This residual foreign-born population is not an estimate of the number of unauthorized migrants. This estimate also includes people in "quasi-legal" status who are awaiting action on their legal migration requests. Any limitations in the methods or in the measurement of other migration components are reflected in the residual number.

Table A-6. Estimates of the Residual Foreign Born by Place of Birth and Sex, 2000*

Country of Birth	*Total*	Male	Female
Total	**8,705,421**	**4,717,733**	**3,987,688**
North and Central America	**5,312,990**	**2,919,604**	**2,393,386**
Mexico	3,871,912	2,137,177	1,734,735
Cuba	216,297	115,377	100,920
Dominican Republic	17,942	8,000	9,942
El Salvador	336,717	196,597	140,120
Guatemala	238,977	146,483	92,494
Canada	156,231	74,772	81,459
Haiti	48,003	22,086	25,917
Jamaica	37,666	16,754	20,912
Trinidad & Tobago	44,178	20,960	23,218
Other North & Central America	345,067	181,398	163,669
South America	**624,419**	**333,092**	**291,327**
Argentina	35,958	19,779	16,179
Colombia	174,786	88,049	86,737
Ecuador	105,197	62,369	42,828
Peru	68,174	37,069	31,105
Other South America	240,304	125,826	114,478
Europe	**1,113,683**	**555,063**	**558,620**
France	36,477	18,234	18,243
Germany	113,327	50,771	62,556
Greece	15,507	9,424	6,083
Ireland**	-2,233	-1,314	-919
Italy	62,456	33,818	28,638
Netherlands	17,885	9,885	8,000
Poland	92,684	47,629	45,055
Portugal	33,874	18,078	15,796
Spain	23,816	12,775	11,041
U.S.S.R. (incl. Est., Lat., Lith.)	344,877	167,149	177,728
United Kingdom	123,246	60,145	63,101
Yugoslavia	110,280	58,347	51,933
Other Europe	141,487	70,122	71,365
Asia	**1,363,419**	**753,272**	**610,147**
Middle East	114,818	70,188	44,630
Iran	30,823	20,504	10,319
Israel	24,372	12,254	12,118
Other Middle East (incl. Afghanistan)	59,623	37,430	22,193
South & East Asia	1,248,601	683,084	565,517
China (incl. Taiwan)	226,886	114,592	112,294
India	200,306	135,059	65,247
Japan	118,357	56,713	61,644
Korea	182,621	93,295	89,326
Philippines	155,239	88,780	66,459
Other South & East Asia	365,192	194,645	170,547
Africa	**243,342**	**130,340**	**113,002**
Oceania	**47,568**	**26,362**	**21,206**
Australia	16,777	9,767	7,010
Other Oceania	30,791	16,595	14,196

* Numbers shown here may differ from numbers produced in actual calculations due to rounding.

** Numbers shown with "-" reflect negative values. See Results section entitled "Country-Specific (Negative) Estimates" for more information.

NOTE: This residual foreign-born population is not an estimate of the number of unauthorized migrants. This estimate also includes people in "quasi-legal" status who are awaiting action on their legal migration requests. Any limitations in the methods or in the measurement of other migration components are reflected in the residual number.

Appendix B. Reference Materials: Bibliography

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Appendix C. Comparing Estimates of the Residual Foreign Born with Estimates Others Have Made of the Unauthorized Migrant Population

Source	Estimate (millions)	Assumed Undercount (percent)	Data Year
DAPE (2001 - U.S. Census Bureau)	8.7 (7.0)* (counted)	---	2000
*8.7 million residual foreign born (7.0 million unauthorized migrants)	10.2 (incl. underct)	15 %	2000
	3.8 (counted)	---	1990
	4.7 (incl. underct)	20 %	1990
Warren (2001 *unpublished*)	6.7 (counted)	---	2000
	7.6 (incl. underct)	10 % (90-00 entrants) & 5 % (pre-90 entrants)	2000
Bean (2001)	7.1 (incl. underct)	15 to 25% (Mexican Illegal Pop); assumed higher for males than females	2000 (Total)
	3.9 (incl. underct)		2000 (Mex only)
	2.5 (incl. underct)		1996 (Mex only)
Woodrow (1991) – U.S. Census Bureau DA, 1990	2.1 (counted)	---	1990
	3.3 (incl. underct)	25%	1990
	2.8 to 5.0 (incl. underct)	10 % to 50 %	1990
Passel (1988) – U.S. Census Bureau DA, 1980	2.1 (counted)	---	1980
	2.5 to 3.5 (incl. underct)	19 to 38% (derived)	1980